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Annotated list of Pachyrhynchini (Coleoptera, Curculionidae, Entiminae) in Davao City, Mindanao, Philippines

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Abstract

Pachyrhynchini are flightless plant-feeding weevils known for their complex and iridescent body ornamentation. This tribe of Curculionidae has its center of diversity in the Philippines, and we present the first comprehensive account of the pachyrhynchine fauna in Davao City, Mindanao, Philippines. Data gathering was conducted using a combination of belt transects, photographic documentation, and opportunistic sampling. Materials were collected between 2016 and 2019 from trees and shrubs in 12 selected green spaces in Davao City using handpicking and bush beating techniques. We document a total of 1103 individuals belonging to 31 species and two genera, *Pachyrhynchus* Germar, 1824 and *Metapocyrtus* Heller, 1912. Twenty-nine species (93.55%) are endemic to Mindanao; 13 species (41.93%) are Vulnerable according to the Philippines Department of Environment and Natural Resources Administrative Order No. 2019-09. The high endemism and the presence of rare species associated with the remaining forest patches call for immediate conservation actions.

Keywords

Beetles, conservation, diversity, endemic, jewel weevils

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Introduction

Weevils (superfamily Curculionoidea) are one of the most speciose and diverse groups in the order Coleoptera, with approximately 62,000 species accounting for 15.5% of the over 400,000 known beetle species worldwide (Oberprieler et al. 2007). They are generally phytophagous and highly associated with angiosperms, but

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some are wood borers, wood-boring frugivores, and a few feed on dung of macropods (Hespenheide 2001; Hangay and Zborowski 2010). Due to their high adaptation and general feeding habits, they are found in almost every terrestrial ecosystem. Weevil diversity is highest in tropical rainforests like those in the Philippines, which can still be considered a taxonomic blank spot due to the limited knowledge and scarcity of weevil studies in these areas. Among the fascinating weevils is the tribe Pachyrhynchini in the subfamily Entiminae. This subfamily is one of the largest groups of weevils, with more than 14,000 described species (Yunakov 2021). The characteristics of Entimine weevils include: "short, broad rostrum with adelognathous mouthparts (the prementum closing the buccal cavity from beneath), mandibles bearing deciduous cusps that assist the teneral weevil to escape from its earthen pupal cell but then break off, and, in the larva, a cushion-like antennal sensorium" (Oberprieler et al. 2007: 506).

The tribe Pachyrhynchini is known primarily for its iridescent and unique elytral patterns. It is characterized by mandibles without a scar or long-lasting appendage on the outer surface and that are uniformly arcuate on the edges, elytra with rounded humeri, hind coxae narrowly parallel with elytra on the sides, and antennal funicle laterally curving out in front of the eyes at the sides of the rostrum (Schultze 1923; Morimoto et al. 2015). Members of this tribe are flightless. They are distributed in the Old World, ranging across Papua New Guinea, Taiwan, Japan, and Australia (Alonso-Zaraga and Lyal 1999; Schultze 1923). The majority of Philippine Pachyrhynchini occur at a wide range of elevations, but most endemic and rare species are associated with high-elevation, forested habitats (Cabras et al. 2016). The combination of a strong preference for forested habitats, limited geographic range, food plant specificity, and the unabated loss of the Philippine forest has made most of the endemic and rare pachyrhynchine species to be categorized as Vulnerable according to the Department of Environment and Natural Resources (DENR) Administrative Order No. 2019-09 Philippine Assessment. Knowledge of this tribe has progressed tremendously in the last decade with the description of several species (Yoshitake 2011, 2012, 2013; Yoshitake and Tsuji 2019; Rukmane 2016, 2017, 2018; Cabras and Rukmane 2016; Cabras and Medina 2018, 2019, 2021; Cabras et al. 2018, 2019, 2021a, 2021b; Bollino et al. 2017, 2020; Bollino and Bordoni 2021). The tribe comprises of 18 genera and about 600 species, of which just under 500 (about 83%) are endemic to the Philippines. Of the 18 genera, only three, *Pachyrhynchus* Germar, 1824, *Homalocyrtus* Heller, 1912, and *Metapocyrtus* Heller, 1912 (*s.l.*), are present in Mindanao. In the past few years, the University of Mindanao Coleoptera Research Center (UMCRC) has conducted expeditions in the remaining green spaces of Davao City in Mindanao and documented a diverse pachyrhynchine fauna which is presented here.

Study Area

Davao City is a first-class, highly urbanized city with a land area of 2,443.61 km^2. It is geographically situated in the southeastern part of Mindanao. It is bordered by mountainous topography on the western side (the Marilog district) and slopes down to the southeastern shore of Davao Gulf leading to the Pacific Ocean on the eastern side. In the city's southwestern tip lies Mount Apo National Park, the highest mountain in the Philippines, a protected area inaugurated by President Manuel L. Quezon in Proclamation 59 of May 8, 1936, to conserve its flora and fauna. Out of the 244,361 ha, 44,000 ha belong to the urban area and the larger portion is forest land. Davao City enjoys a mild tropical climate with distinct hot and wet seasons. The city is outside the typhoon belt and lacks major seasonal variations. Its average monthly temperatures are always above 26 °C, and average monthly rainfall is above 77 mm.

The areas where collections were made are given in Table 1 and shown in Figure 1.

Methods

The data presented here is the results of field surveys conducted between December 2017 and April 2020 and literature reviews. Collecting permits were obtained from the Philippines Department of Environment and Natural Resources. Collection was done on trees and shrubs using handpicking and bush beating techniques through a combination of belt transects and opportunistic sampling in the green spaces of Davao City and its surrounding environs. Specimens were collected and stored in vials with 70% ethyl alcohol. Photographs of individual

Table 1. Sampling sites in Davao City, Philippines; see also Figure 1.

Site	Location	Latitude (°N)	Longitude (°E)	Elevation (m)
A	Sicao Village, Tamayong, Calinan	07.0231	125.2021	1600
B	Marilog District, Eagle's Ridge forest (Dologon-Busco-Quezon Road, Datu Salumay)	07.1686	125.1941	532
C	Epol Falls forest	07.2713	125.1415	1152
D	LawiLawi Adventure Park and Cottages forest (km 77, Davao-BUDA Highway, Epol)	07.2718	125.1425	1239
E	Highway 81 forest	07.2912	125.1456	1174
F	Catigan, Toril	07.0047	125.2407	1000
G	Baguio District Davao City	07.1104	125.2210	800
H	Barangay Dominga, Calinan	07.1352	125.2851	900
I	Shrine Hills, Matina Davao City	07.0353	125.3449	400 m a.s.l.

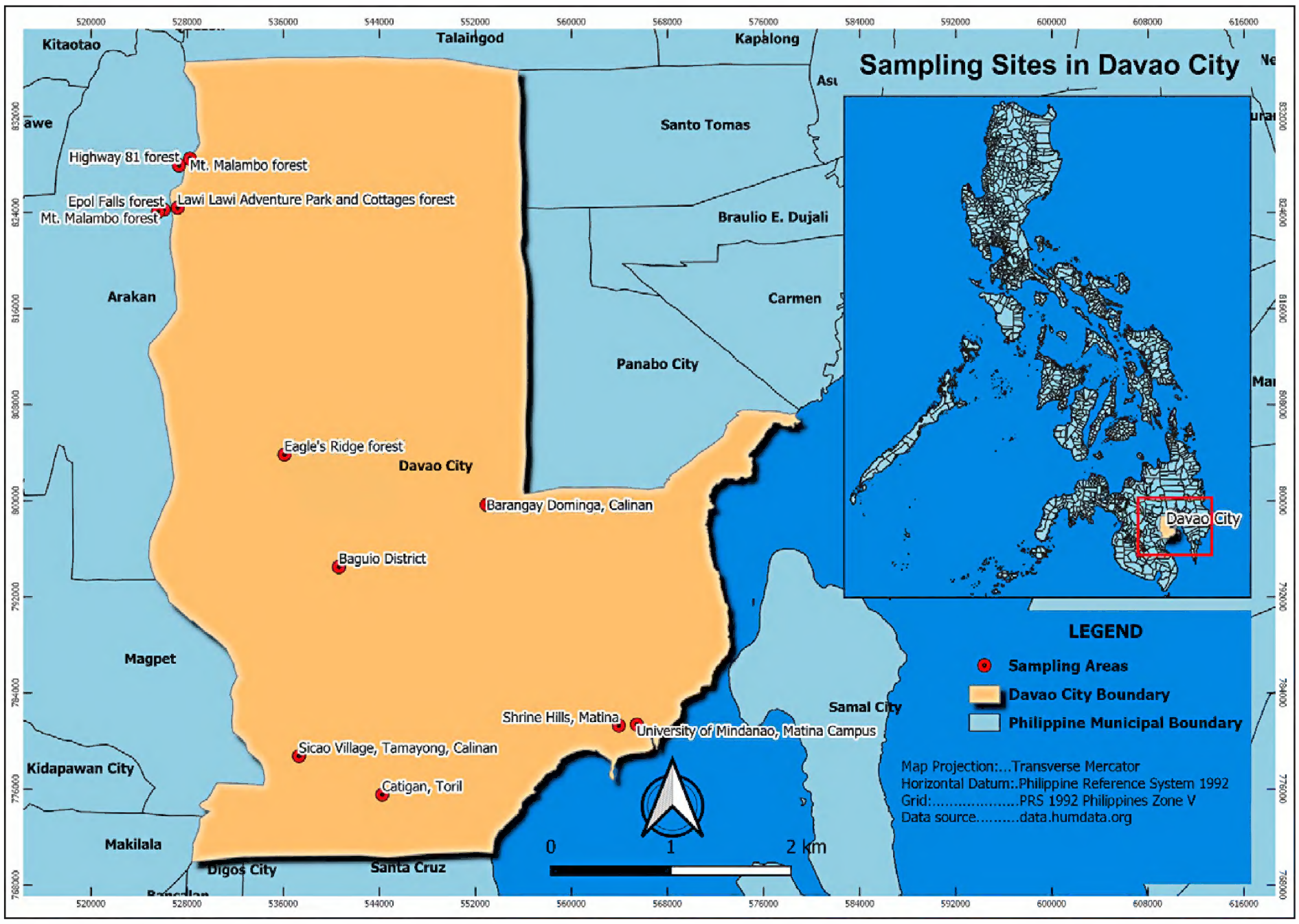

Figure 1. Sampling sites in Davao City, Philippines; see also Table 1.

habitus were taken using Canon EOS 6D camera and Canon MP-E 65mm macro lens and equipped with Helicon Focus auto montage for photo stacking and subsequently edited in Photoshop CS6 Extended. Specimens were examined and identified under Nikon SMZ745T binocular stereomicroscope and compared with the type materials. Specimens were labeled with species name, date and place of collection, collector, and a separate label for the name of the identifier, and the museum collection code. Specimens examined for comparison are deposited in the following collections:

DUBC Daugavpils University, Institute of Life Sciences and Technology, Coleopterological Research Centre, Daugavpils, Latvia

SMTD Senckenberg Natural History Collections, Dresden, Germany

UMCRC University of Mindanao Coleoptera Research Center, Davao City, Philippines

Results

We collected 1103 individuals representing 31 species from two genera, *Pachyrhynchus* Germar 1824 and *Metapocyrtus* Heller, 1912 (*s.l.*) from the 12 sampling sites in Davao City (Fig. 1). Twenty-two species belong to the genus *Metapocyrtus s.l.*, and nine belong to the genus *Pachyrhynchus*. Of the 31 species documented, 29 (93.55%) are endemic to Mindanao, and the other two species, *P. erichsoni* Waterhouse, 1842 and *M.* (*Trachycyrtus*) *adspersus* (Waterhouse, 1843), are widely distributed throughout the Philippines. *Metapocyrtus* (*T.*) *adspersus* has been introduced in Malaysia, Singapore, and Japan through the plant trade (Yoshitake and Tsuji 2019). Based on DENR Administrative Order No. 2019-09 Updated List of Threatened Philippine Fauna and their Categories, 13 pachyrhynchine species (41.93%) in Davao City are Vulnerable while the remaining 18 species (58.06%) are Data Deficient. The most abundant species are *M.* (*Dolicocephalocyrtus*) *bituberosus* Heller, 1912 with 168 total specimens (15.23% of the total catch), *M.* (*D.*) *linneaticolis* Schultze, 1925 with 107 specimens (9.7%), *M.* (*D.*) *ruficollis* (Waterhouse, 1842) with 87 specimens (7.88%), and *M. clemensi* Schultze, 1925 with 60 specimens (5.44%); the least abundant are the *Pachyrhynchus* species. Among the 31 species, seven are new to science, six were recently described (Bollino et al. 2020; Cabras et al. 2021), and one is under description. The recently published new species from Davao City are *P. obumanuvu* Cabras, Medina, Donato & Van Dam, 2021, *M. tagabawa* Cabras, Medina, & Bollino, 2020, *M.* (*Orthocyrtus*) *davaoensis* Cabras, Medina, & Bollino, 2021, *M.* (*Metapocyrtus*) *ged* Cabras & Medina, 2021, *M.* (*M.*) *flavomaculatus* Cabras & Medina, 2021, and *M. um* Cabras &Van Dam, 2021 discovered in Catigan, Toril, Marilog District, Baguio District, and Calinan, Davao

City, respectively. The discovery of new species in even a highly urbanized area such as Davao City is a testament to the great diversity and how little studied this tribe is in the country.

Annotated list

Genus *Metapocyrtus* Heller, 1912

The genus *Metapocyrtus* is predominantly endemic to the Philippines but with a few species endemic to Japan and Orchid Island. It currently is represented by over 250 species in seven subgenera. The general diagnostic characteristic of this genus includes "rostrum apically not swollen, basally with a more or less strongly pronounced transverse groove; scape of antenna reaching at least to or beyond hind margin of eye." (Schultze 1925: 135).

Subgenus *Artapocyrtus* Heller, 1912

The subgenus *Artapocyrtus* is currently comprised of 25 species (Yap 2008; Yoshitake 2011; Bollino et al. 2019) and is characterized mainly by the short rostrum which is as long as wide and bears distinct dorso-lateral edges (Schultze 1925; Yap and Gapud 2007).

Metapocyrtus (*Artapocyrtus*) sp.

Materials examined. PHILIPPINES – **Davao City** • Sicao Village, Tamayong, Calinan; 07.0231°N, 125.2021°E; 1600 m a.s.l.; 3.v.2019; local collector leg.; opportunistic; 7♂, 3♀, UMCRCMA1–10 • Marilog District: Eagle's Ridge forest (Dologon-Busco-Quezon Road, Datu Salumay); 07.1686°N, 125.1941°E; 532 m a.s.l.; 12.v.2018; local collector leg.; opportunistic; 5♂, 4♀, UMCRCMA11–19 •

Identification. This species bears a close resemblance to *M.* (*A.*) *bifasciatus* (Waterhouse, 1842), *M.* (*A.*) *comes* (Tachenberg in Heyne & Taschenberg 1908), *M.* (*A.*) *ruficrus* van Emden, 1932, *M.* (*A.*) *violaceus* Schultze, 1919, and *M.* (*A.*) *sakaii* Yoshitake, 2011 in having similar basal and apical stripes. However, *M.* (*A.*) sp. from Davao City has fainter pale blue basal and subapical scaly stripes.

Endemism and distribution. Mindanao endemic distributed in Davao City.

Remarks. The species was collected along with *M.* (*D.*) *ruficollis* in open grassland areas in Marilog at an elevation of 1200–1343 m a.s.l. adjacent to the secondary forests. It is abundant in the forested habitats in Marilog and Sicao Village. This is possibly an undescribed species. This species group needs revision.

Subgenus *Dolichocephalocyrtus* Schultze, 1925

The subgenus *Dolichocephalocyrtus*, which is currently represented by 22 extant species (Yap 2008; Cabras et al. 2020), is characterized by having a long, slender rostrum 0.60–0.76 times as long as wide, with a V-shaped ridge on basal half in males and protuberance on its basal half in females; male elytra with a rounded apex and steep apical declivity, and female elytra with a sharp, triangular projection at the apex (Schultze 1925; Yap and Gapud 2007).

Metapocyrtus (*Dolichocephalocyrtus*) *bituberosus* Heller, 1912

Materials examined. PHILIPPINES – **Davao City** • Sicao Village, Tamayong, Calinan; 07.0231°N, 125.2021°E; 1600 m a.s.l.; 3.v.2019; local collector leg.; opportunistic; 4♂, 2♀, UMCRCMD1–6 • Shrine Hills, Matina Davao City; 07.0353N, 125.3449°E; 400 m a.s.l.; 5.i.2019; local collector; opportunistic; 4♂, 4♀, UMCRCMD7–15 • Catigan, Toril; 07.0047°N, 125.2407°E; 1000 m a.s.l.; 3.v.2019; local collector; opportunistic; 5♂, 6♀, UMCRCMD16–26 • Baguio District Davao City; 07.1104°N, 125.2210°E; 800 m a.s.l.; 3.v.2019; local collector; opportunistic; 6♂, 12♀, UMCRCMD27–44 • Sicao Village, Tamayong, Calinan; 07.0231°N, 125.2021°E; 1600 m a.s.l.; 3.v.2019; local collector leg.; opportunistic; 4♂, 2♀, UMCRCMD45–50 • Shrine Hills, Matina Davao City; 07.0353°N, 125.3449°E; 400 m a.s.l.; 5.i.2019; local collector; opportunistic; 5♂, 4♀, UMCRCMD51–59 • Catigan, Toril; 07.0047°N, 125.2407°E; 1000 m a.s.l.; 3.v.2019; local collector; opportunistic; 5♂, 6♀, UMCRCMD60–70 • Baguio District Davao City; 07.1104°N, 125.2210°E; 800 m a.s.l.; 10.v.2019; local collector; opportunistic; 6♂, 6♀, UMCRCMD71–82.

Identification. *Metapocyrtus* (*D.*) *bituberosus* is easily recognized by its pronotum and elytra densely covered with green scales, although some specimens have bluish and golden-yellow scales. Some variations of the species have three transverse scaly stripes on the basal, median, and subapical parts.

Endemism and distribution. A Mindanao endemic. Davao; Dolicaon, Bukidnon (Yap 2008).

Remarks. Schultze (1925) treated *M.* (*D.*) *bituberosus* as a variety, which was later treated as a subspecies by Yap (2008). However, we agree with Schultze (1923) in considering it is only a variety following Article 45.6 stating that "the rank denoted by a species-group name following a binomen is subspecific, except that (45.6.1) it is infrasubspecific if its author expressly gave it infrasubspecific rank, or if the content of the work unambiguously reveals that the name was proposed for an infrasubspecific entity". Schultze gave var. *davaoensis* its infrasubspecific rank by explicitly assigning another *M.* (*D.*) *bituberosus samalensis* which is in the same paper into a subspecific rank (Schultze 1925). Morphologically, *M.* (*D.*) *bituberosus* var. *davaoensis* and *M.* (*D.*) *bituberosus* are very similar except for the three transverse scaly stripes in the elytra of *M.* (*D.*) *bituberosus* var. *davaoensis*. The species is widely distributed in the secondary and fragmented green spaces in Davao City. Although this species is more abundant in habitats with more lush secondary forests, it seems to thrive in highly degraded habitats such as in Shrine Hills Matina, a fragmented green space in a highly urbanized area.

Metapocyrtus (*Dolichocephalocyrtus*) *clemensi* Schultze, 1925

Figure 2D

Materials examined. PHILIPPINES – Davao City • Baguio District Davao City; 07.1104°N, 125.2210°E; 800 m a.s.l.; 3.v.2019; local collector leg.; opportunistic; 5♂, 11♀, UMCRCMD83–98 • Marilog District: Eagle's Ridge (Dologon-Busco-Quezon Road, Datu Salumay); 07.1686°N, 125.1941°E; 532 m a.s.l.; 15.iii.2018; local collector; opportunistic; 2♂, 3♀, UMCRCMD99–103 Davao City • Sicao Village, Tamayong, Calinan; 07.0231°N; 125.2021°E; 1600 m a.s.l.; 3.v.2019; local collector; opportunistic; 11♂, 3♀, UMCRCMD104–117.

Identification. This species is easily distinguished from other *Dolicocephalocyrtus* species by its three transverse bands on the elytra and rostrum with deep, elongate medial depression and rounded dorsolateral edge. The other *Dolicocephalocyrtus* species have plain rugose rostrums with a V-shape ridge (Schultze 1925).

Endemism and distribution. A Mindanao endemic. Mount Apo, Davao (Yap 2008).

Conservation status. Vulnerable (DENR-DAO 2019).

Remarks. This species is one of the most abundant species in Davao City and is found in almost every remaining patch of disturbed secondary forests.

Metapocyrtus (*Dolicocephalocyrtus*) *lineaticollis* Schultze, 1925

Materials examined. PHILIPPINES – Davao City • Sicao Village, Tamayong, Calinan; 07.0231°N, 125.2021°E; 1600 m a.s.l.; 12.iii.2019; local collector; opportunistic; 14♂, 9♀, UMCRCMD118–140 • Baguio District; 07.1104°N, 125.2210°E; 800 m a.s.l.; 12.iii.2017; local collector; opportunistic; 6♂, 1♀, UMCRCMD142–147 • Catigan, Toril; 07.0047°N, 125.2407°E; 1000 m a.s.l.; 29.v.2019; A. Rukmane leg.; opportunistic; 1♂, UMCRCMD148.

Identification. Body, pronotum, and rostrum black, legs red. Pronotum with a longitudinal scaly stripe along midline, narrow scaly stripe on apical margin, and two longitudinal scaly stripes on each side of the disc; elytra with three narrow, transverse, scaly bands confluent at the lateral margin.

Endemism and distribution. A Mindanao endemic. Mumungan, Lanao (Schultze 1925); Davao City.

Conservation status. Vulnerable (DENR-DAO 2019).

Remarks. This species is one of the most abundant in the mid-elevation areas sampled in Davao City.

Metapocyrtus (*Dolicocephalocyrtus*) *ruficollis* Waterhouse, 1842

Materials examined. PHILIPPINES – **Davao City** • Marilog District: Eagle's Ridge (Dologon-Busco-Quezon Road, Datu Salumay); 07.1686°N, 125.1941°E; 532 m a.s.l.; 28–29.iii.2018; local collector; opportunistic; 9♂, 6♀, UMCRCMD149–163 • 3ex.- Philippines, Mindanao, / Davao, Marilog distr., / Baganihan, 27–28.iii.2018. / A. Barševskis. leg.

Identification. Elytra and rostrum black, pronotum and legs burnished red. This species can be distinguished from its congeners for having burnished red pronotum and strongly subglobular prothorax equal to or slightly broader than the elytra (Schultze 1925).

Endemism and distribution. Mindanao Endemic: Cagayan; Lindaban, Bukidnon (Schultze 1925).

Conservation status. Vulnerable (DENR-DAO 2019).

Remarks. This is one of the most abundant species in Marilog District in open areas that are adjacent to secondary forests. It is often found copulating on Cogon Grass, *Imperata cylindrica* (L.) P.Beauv. (Poaceae) as well as other weeds abundant in the area.

Subgenus *Metapocyrtus* Heller, 1912 (*s.s.*)

This subgenus with 88 known species has the "rostrum with rounded dorsolateral edges, elytra laterally elliptical or dorsally ovate, anterior margin of pronotum truncate and strongly pronounced" (Yap and Gapud 2007; Bollino and Bordoni 2021).

Metapocyrtus (*Metapocyrtus*) *lindabonus* Schultze, 1922

Figure 2E

Materials examined. PHILIPPINES – **Davao City** • Catigan, Toril; 07.0047°N, 125.2407°E; 1000 m a.s.l.; 14–15.iv.2019; local collector; opportunistic; 10♂, 9♀, UMCRCMM1–19 • Marilog District: Eagle's Ridge (Dologon-Busco-Quezon Road, Datu Salumay); 07.1686°N, 125.1941°E; 532 m a.s.l.; 5.iv.2017; local collector; opportunistic; 2♂, 1♀, UMCRCMM20–22.

Identification. Integuments black, pronotum with two elliptical scaly patches on both sides of the disc near the basal margin, and elytra narrow ovate with three transverse bands or stripes.

Endemism and distribution. A Mindanao endemic. Marilog District, Davao City; Lindaban, Bukidnon (Yap 2008).

Conservation status. Vulnerable (DENR-DAO 2019).

Remarks. This species is abundant from Bukidnon down to Marilog District. In Marilog it is usually found on shrubs and trees in the secondary forests. It is a highly polymorphic species, but it can still be distinguished by the general shape of body, rostrum, and pronotum, as well as the consistent pronotal markings. Its elytral pattern ranges from full broad bands to stripes. The variation in the elytra can easily lead to the belief that there are different species.

Metapocyrtus (*Metapocyrtus*) *flavomaculatus* Cabras & Medina, 2021

Materials examined. PHILIPPINES – Davao City • Marilog District: Eagle's Ridge (Dologon-Busco-Quezon Road, Datu Salumay); 07.1686°N; 125.1941°E; 532 m

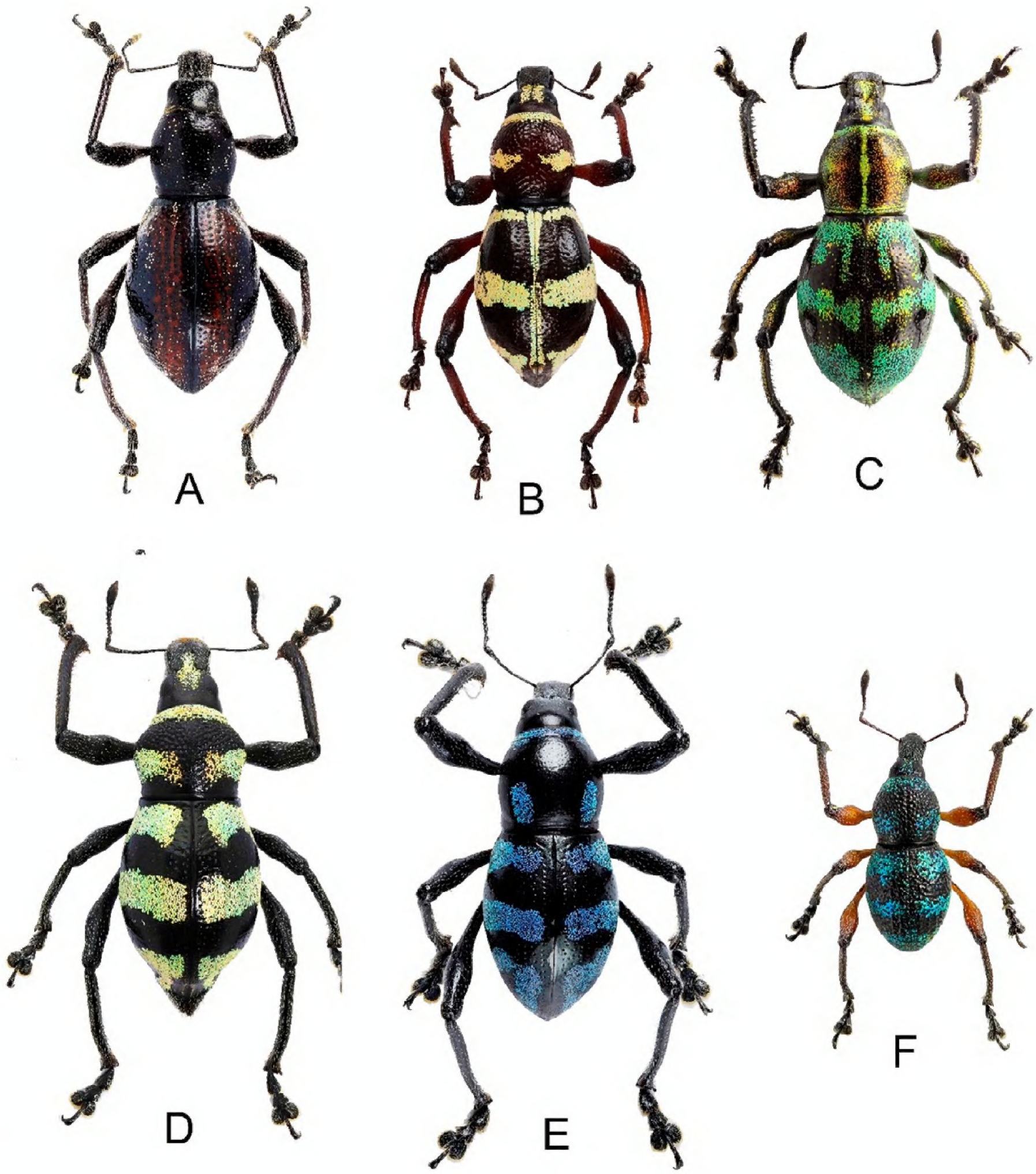

Figure 2. *Metapocyrtus* spp. in Davao City. **A.** *M. um*. **B.** *M. ged* **C.** *M. kitangladensis*. **D.** *M. clemensi*. **E.** *M. lindabonus*. **F.** *M. apoensis*.

a.s.l.; 5–7.iii.2017; local collector; opportunistic; 1♂, 5♀, UMCRCMM23–28.

Endemism and distribution. A Mindanao endemic. Marilog District, Davao City.

Identification. Black integuments. Dorsal surface of rostrum weakly convex with faint, V-shaped ridge; prothorax subglobular; pronotum with two elongate subbasal and subapical spots on dorsum, and stripes before the coxa; elytra strongly ovate, broader and longer than prothorax and with eight spots on each elytron of which two are positioned basally, three medially, and another three apically.

Taxonomic note. In the original description (Cabras and Medina 2021), the feminine gender of the species-group name did not agree with the masculine gender of *Metapocyrtus* and, thus, was not in accordance with the ICZN (Article 31.2). We correct the gender to *M. flavomaculatus*.

Remarks. This species was abundantly collected in the leaves of *Impatiens* sp. (Balsaminaceae) in the understory of secondary forests.

***Metapocyrtus* (*Metapocyrtus*) *ged* Cabras & Medina, 2021**

Figure 2B

Materials examined. PHILIPPINES – **Davao City** • Catigan, Toril; 07.0047°N, 125.2407°E; 800-1000 m a.s.l.; 5–7.iii.2018; local collector; opportunistic; 3♂, 8♀, UMCRCMM29–39.

Identification. Integument black; pronotum, antennae, and legs dark ferruginous. Dorsal surface of rostrum bearing a V-shape ridge; rostrum with a rounded dorso-lateral edge; pronotum with a narrow, scaly stripe at the anterior margin, narrow transverse stripe across entire width at mid-length, and lateroventral stripe before the coxa confluent with the anterior margin and transverse stripe at the middle. Elytra subelliptical with a subbasal, narrow, transverse, scaly stripe from suture to lateral margin, a narrow median transverse scaly band across entire width, subtriangular scaly patch on the apical fourth, scaly stripe along lateral margin confluent with subbasal band, medial band, and triangular stripe at apex, and a faint scaly stripe along the suture.

Endemism and distribution. A Mindanao endemic. Catigan, Toril, Davao City.

Remarks. We collected this species on the slope at the foot of Mountt Apo in Catigan, Toril, at around 1300 m in elevation. The specimens were collected using a beating sheet on pandan *Pandanus* sp. (Pandanaceae) leaves.

Subgenus *Orthocyrtus* Heller,1912

The subgenus *Orthocyrtus* has 42 known species (Cabras et al. 2022), which are characterized by their large size (10.0–17.0 mm), a common feature of this subgenus, medium length rostrum (0.60–0.70 times as long as wide), which is dorsally straight, mostly in a plane with frons, and at the base, the sides are rectangularly declined (Schulzte 1925; Yap and Gapud 2007; Cabras et al. 2018).

Metapocyrtus (*Orthocyrtus*) *lanusinus* Schultze, 1922

Materials examined. PHILIPPINES – **Davao City** • Baganihan, Lawi Lawi Adventure Park and Cottages (Davao-BUDA Highway, Epol); 07.2718°N, 125.1425°E; 1239 m a.s.l.; 5–7.iii.2018; local collector; opportunistic; 5♂, 10♀, UMCRCMO1–15.

Identification. This is a large species with black integument. The pronotum has posterior and anterior narrow, scaly stripes. It has a transverse medial scaly stripe on pronotum, and the elytra have scaly stripes along the suture and around three or four longitudinal, but interrupted, scaly stripes from base to apex.

Endemism and distribution. A Mindanao endemic. Lindaban, Bukidnon (Schultze 1922, 1925); Marilog, Davao City.

Conservation status. Vulnerable (DENR-DAO 2019).

Remarks. This species is abundant from Bukidnon to Marilog District but is no longer recorded in the urban areas of Davao City. Many *O. lanusinus* specimens were collected on *Swietenia macrophylla* King (Meliaceae) and introduced *Pinus* sp. (Pinaceae) trees in Marilog.

Metapocyrtus (*Orthocyrtus*) *davaoensis* Cabras, Medina & Bollino, 2021

Materials examined. PHILIPPINES – **Davao City** • Calinan, Dominga; 07.1352°N, 125.2851°E; 900 m a.s.l.; 5–7.iii.2018; A. Cabras leg.; opportunistic; 5♂, 6♀, UMCRCMO16–26.

Identification. Integument black; prothorax subglobular, with a narrow, scaly stripe at the anterior and posterior margins, a transverse stripe across the entire width at mid-length, and lateroventral scaly stripe before coxa; elytra subovate with short scaly stripes from behind base to before middle, median, transverse stripe, subtriangular scaly patch on apical third, a small dot on interval V at the apical quarter, and long scaly stripe along the lateral margin from behind base to apex, confluent with basal, median, and apical stripes (Cabras et al. 2021).

Endemism and distribution. A Mindanao endemic. Baguio District, Calinan, Davao City; Gumitan, Davao del Sur; Cabanglasan, Bukidnon.

Remarks. This species has been collected on the leaves of *Sandoricum koetjape* (Burm.f.) Merr.(Meliaceae) and *Swietenia macrophylla* (Meliaceae).

Metapocyrtus (*Orthocyrtus*) cf. *schoenherri* Waterhouse, 1842

Materials examined. PHILIPPINES – **Davao City** • Catigan, Toril; 07.0047°N, 125.2407°E; 1000 m a.s.l.; 14–15.iv.2019; local collector; opportunistic; 9♂, 12♀, UMCRCMO27–47 • Marilog District: Eagle's Ridge (Dologon-Busco-Quezon Road, Datu Salumay); 07.1686°N, 125.1941°E; 532 m a.s.l.; 5.iii.2018; local collector; opportunistic; 1♂, UMCRCMO48.

Identification. Black integument; prothorax subglobular with two small scaly spots on each side of the disc and each elytron with seven scaly spots: two basal spots, two spots on median portion, and three subapical spots, and an elongated stripe on apical margin.

Endemism and distribution. A Mindanao endemic. Catigan, Toril, Davao City; Surigao (Schultze 1925).

Remarks. This species was collected along with *M. lindabonus*, another spotted species, in Catigan, Toril. However, *M. schoenherri* can be easily distinguished from *M. lindabonus* by its larger size and the shape of its rostrum.

Metapocyrtus (*Orthocyrtus*) sp.

Materials examined. PHILIPPINES – **Davao City** • Sicao Village, Tamayong, Calinan; 07.0231°N, 125.2021°E; 1600 m a.s.l.; 14.iv.2018; local collector; opportunistic; 1♂, 5♀, UMCRCMO27–32 • Catigan, Toril; 07.0047°N, 125.2407°E; 1000 m a.s.l.; 14.iv.2019; local collector; opportunistic; 1♂, UMCRCMO33 • Sicao Village, Tamayong, Calinan; 07.0231°N, 125.2021°E; 1600 m a.s.l.; 28–29.iv.2019; A. Rukmane leg.; opportunistic; UMCRCMO34.

Identification. This species is morphologically similar to *M.* (*O.*) *schoenherri* but is totally black and without spots.

Endemism and distribution. A Mindanao endemic. Tamayong, Calinan, Davao City.

Remarks. The species was collected on the slope of Tamayong, Calinan, with lush vegetation at approximately 1300 m a.s.l.

Subgenus *Sphenomorphoidea* Heller, 1912

The subgenus *Sphenomorphoidea*, which currently is represented by 10 species, is characterized by having the "rostrum longer than broad (0.75–0.85 times) toward apex slightly divergent, dorsally convex, separated from front by a deep transverse basal groove. Front slightly curved. Anterior margin of prothorax ventrally slightly emarginate; prothorax furthermore with a distinct anterior submarginal groove" (Schultze 1925: 150) – copied verbatim.

Metapocyrtus (*Sphenomorphoidea*) cf. *metallicus* Heller, 1912

Materials examined. PHILIPPINES – **Davao City** • Marilog District: Eagle's Ridge (Dologon-Busco-Quezon Road, Datu Salumay); 07.1686°N, 125.1941°E; 532 m a.s.l.; 12.iii.2018; local collector; opportunistic; 9♂, 4♀, UMCRCMS1–13 • Baguio District; 07.1104°N; 125.2210°E; 800 m a.s.l.; 5.iii.2017; local collector; opportunistic; 3♂, 1♀, UMCRCMS14–17.

Identification. Integuments black; prothorax globular, with narrow scaly stripes along anterior and posterior margins, two scaly spots on either side of disc, and a longitudinal scaly stripe along the midline. Elytra with the following scaly markings: two basal spots, a transverse stripe along the median portion, a subapical spot, and a stripe on the apical margin.

Endemism and distribution. A Mindanao endemic. Marilog District, Davao City*.

Remarks. This species is quite prevalent in the secondary forests of Marilog District.

Metapocyrtus (*Sphenomorphoidea*) sp.

Materials examined. PHILIPPINES – Davao City • Marilog District: Eagle's Ridge (Dologon-Busco-Quezon Road, Datu Salumay); 07.1686°N, 125.1941°E; 532 m a.s.l.; 12.iii.2018; local collector; opportunistic; 2♂, UMCRCMS18–19.

Identification. This species is very similar in morphology to *M.* (*S.*) *metallicus* but it is totally black, without pronotal or elytral scaly marks, and has a more pronounced hump on the dorsum of the prothorax.

Endemism and distribution. A Mindanao endemic. Marilog District, Davao City.

Remarks. This species is quite prevalent in the secondary forests of Marilog District.

Subgenus *Trachycyrtus* Heller, 1912

The subgenus *Trachychyrtus* currently is represented by 47 species (Yap 2008; Genka and Yoshitake 2018). It is distinguished from the other subgenera in being mostly small (<4.5 mm), although some are medium-sized (4.5–10.2 mm) and in having a granulate prothorax and punctured, subtuberculate, or granulate elytra (Schultze 1925).

Metapocyrtus (*Trachycyrtus*) *adspersus* Waterhouse, 1843

Materials examined. PHILIPPINES – **Davao City** • Sicao Village, Tamayong, Calinan; 07.0231°N, 125.2021°E; 1600 m a.s.l.; 5.v.2019; local collector; opportunistic; 6♂, 4♀, UMCRCMT1–10 • Barangay Dominga, Calinan; 07.1352°N, 125.2851°E; 900 m a.s.l.; 12.iii.2018; local collector; opportunistic; 8♂, 10♀, UMCRCMT11–28 • Marilog District: Eagle's Ridge forest (Dologon-Busco-Quezon Road, Datu Salumay); 07.1686°N, 125.1941°E; 532 m a.s.l.; 12.iii.2018; local collector; opportunistic; 10♂, 10♀, UMCRCMT29–48 • Catigan, Toril; 07.0047°N, 125.2407°E; 1000 m a.s.l.; 5.v.2019; local collector; opportunistic; 15♂, 8♀, UMCRCMT49–71.

Identification. This species has black integument except for the legs, which are reddish-brown. The prothorax and the elytra are densely covered in greenish and pale-yellow round scales.

Endemism and distribution. A Philippine endemic. Bohol, Biliran, Leyte and Samar (Yap 2008); Marilog District, Baguio District Calinan, Tamayong, Calinan, Shrine Hills, Davao City; Bilar, Bohol; Biliran, Palompon, Leyte; Samar (Yap 2008).

Remarks. This is by far one of the most widespread species. Although it was originally known from central and eastern Visayas, it is now recorded and found in abundance in Mindanao. Recently, the species has also been recorded in Malaysia, Japan, and Singapore (Yoshitake and Tsuji 2019).

Metapocyrtus (*Trachycyrtus*) *apoensis* Schultze, 1925

Figure 2F

Materials examined. PHILIPPINES – **Davao City** • Sicao Village, Tamayong, Calinan; 07.0231°N, 125.2021°E; 1600 m a.s.l.; 5.v.2019; local collector; opportunistic; 8♂, 2♀, UMCRCMT72–81 • Baguio District; 07.1104°N, 125.2210°E; 800 m a.s.l.; iii.2018; local collector; opportunistic; 8♂, 10♀, UMCRCMT82–99 • Marilog District: Eagle's Ridge forest (Dologon-Busco-Quezon Road, Datu Salumay); 07.1686°N, 125.1941°E; 532 m a.s.l.; iii.2018; local collector; opportunistic; 10♂, 10♀, UMCRCMT100–199 • Catigan, Toril; 07.0047°N, 125.2407°E; 1000 m a.s.l.; v.2019; local collector; opportunistic; 15♂, 8♀, UMCRCMT120–142.

Identification. Integument black except for reddish-brown legs. Prothorax and elytra granulate. Prothorax with a narrow, greenish, scaly stripe at anterior margin and a thick transverse band across entire width. Elytra with three transverse bands of green to golden, round scales.

Endemism and distribution. A Mindanao endemic. Sta. Cruz, Davao del Sur.

Conservation status. Vulnerable (DENR-DAO 2019).

Remarks. This species is quite common, especially in areas with anthropogenic disturbances.

Metapocyrtus (*Trachycyrtus*) *pinya* Genka & Yoshitake, 2018

Materials examined. PHILIPPINES – Davao City • Sicao Village, Tamayong, Calinan; 07.0231°N, 125.2021°E; 1600 m a.s.l.; iii.2019; local collector; opportunistic; 5♂, 6♀, UMCRCMT143–153.

Identification. This species bears a very close resemblance to *M.* (*T.*) *apoensis* but differs by having scattered round scales in between the three scaly bands and a pair of subconical projections of sparse tufts of piliform scales along suture at the beginning of the elytral declivity.

Endemism and distribution. A Mindanao endemic. Calinan, Davao City.

Metapocyrtus kitanglandensis Cabras, Medina & Zhang, 2019

Figure 2C

Materials examined. PHILIPPINES – **Davao City** • Baguio District Davao City; 07.1104°N, 125.2210°E; 800 m a.s.l.; iii.2019; local collector; opportunistic; 2♂, 1♀, UMCRCMk1–3 • Highway 81 forest; 07.2912°N, 125.1456°E; 1174 m a.s.l.; vi.2018; M. van Dam leg.; opportunistic; 1♂, UMCRCMk4 • Epol Falls forest; 07.2713°N, 125.1415°E; 1152 m a.s.l.; vi.2018; local collector; opportunistic; 1♂, UMCRCMk5.

Identification. Body black; pronotum, head, and legs coppery black, weakly lustrous with sparse pale yellow, green, and violet scales; body surface weakly lustrous with golden-yellow, orange, greenish, turquoise, and bluish scales. Pronotum subglobular with narrow stripes at the anterior, posterior, and latero-ventral margins, and three narrow longitudinal stripes on disc. Each elytron with three longitudinal basal stripes, a narrow transverse medial stripe, a narrow longitudinal stripe between interval I and II extending from middle to apex, confluent with stripe along lateral margin, and a triangular stripe extending from apical third to apex, laterally connected with marginal stripe.

Endemism and distribution. A Mindanao endemic. Marilog District, Davao City; Barangay Buda, Davao Del Sur; Mount Kitanglad, Mount Dulang-dulang, Mount Kiamo, Bukidnon (Cabras et al. 2019).

Remarks. This species is distributed from Bukidnon towards Davao City. It was found predominantly on the fronds of *Angiopteris evecta* (G.Forst.) Hoffm (Marattiaceae) and was collected in the closed canopy. It was mostly found in the less disturbed secondary forests of Bukidnon, Marilog, and Calinan, Davao City, which can be an indication that it prefers intact forests.

Metapocyrtus tagabawa Cabras, Medina & Bollino, 2020

Figure 7

Materials examined. PHILIPPINES – **Davao City** • Catigan, Toril; 07.0047°N, 125.2407°E; 1000 m a.s.l.; iii.2017; A. Cabras leg.; opportunistic; 1♂, UMCRCMt1 • Catigan, Toril; 07.0047°N, 125.2407°E; 1000 m a.s.l.; iv.2019; M. Medina leg.; opportunistic; 10♂, 10♀, UMCRCMt2–21.

Identification. Integument weakly lustrous black, with green and turquoise scales. Pronotum subglobular, with a stripe at anterior margin and transverse stripe slightly behind mid-length. Elytra coarsely punctate, with three transverse, scaly stripes: narrow subbasal stripe, narrow transverse stripe at highest point of elytra, and subtriangular stripe at apical third.

Endemism and distribution. A Mindanao endemic. Catigan Toril, Davao City; Wao, Lanao del Sur (Bollino et al. 2020).

Remarks. This species is found in the secondary forest on the southeastern slope of Mount Apo. It was in a very narrow area of not more than 500 m^2 along the trail and in a closed canopy. It was found abundantly, feeding, copulating, and perching on *Melastoma* sp. (Melastomaceae) and some unknown dipterocarp trees.

Metapocyrtus um Cabras & Van Dam, 2021

Figure 2A

Materials examined. PHILIPPINES – Davao City • Marilog District: Eagle's Ridge (Dologon-Busco-Quezon Road, Datu Salumay); 07.1686°N, 125.1941°E; 532 m a.s.l.; iii.2017; local collector; opportunistic; 1♀, UMCRCM1.

Identification. Body and legs dark ferruginous with sparse, light yellow-ochre scales.

Endemism and distribution. A Mindanao endemic. Marilog District, Davao City.

Remarks. Only a few specimens were found, particularly in the remaining semi-pristine forest in Marilog District. The small mountain where the species occurs has been isolated due to the presence of resorts and human habitation.

Metapocyrtus sp. 1

Materials examined. PHILIPPINES – **Davao City** • Marilog District: Eagle's Ridge (Dologon-Busco-Quezon Road, Datu Salumay); 07.1686°N, 125.1941°E; 532 m a.s.l.; iii.2017; local collector; opportunistic.

Identification. Integument black. Prothorax with a narrow, scaly stripe at the anterior margin and two elongate spots on each side near posterior margin. Each elytron with seven or eight scaly spots: two subbasal spots, three median spots, and two or three spots near apex. We were unable to fully identify this species based on the available specimens.

Endemism and distribution. A Mindanao endemic.

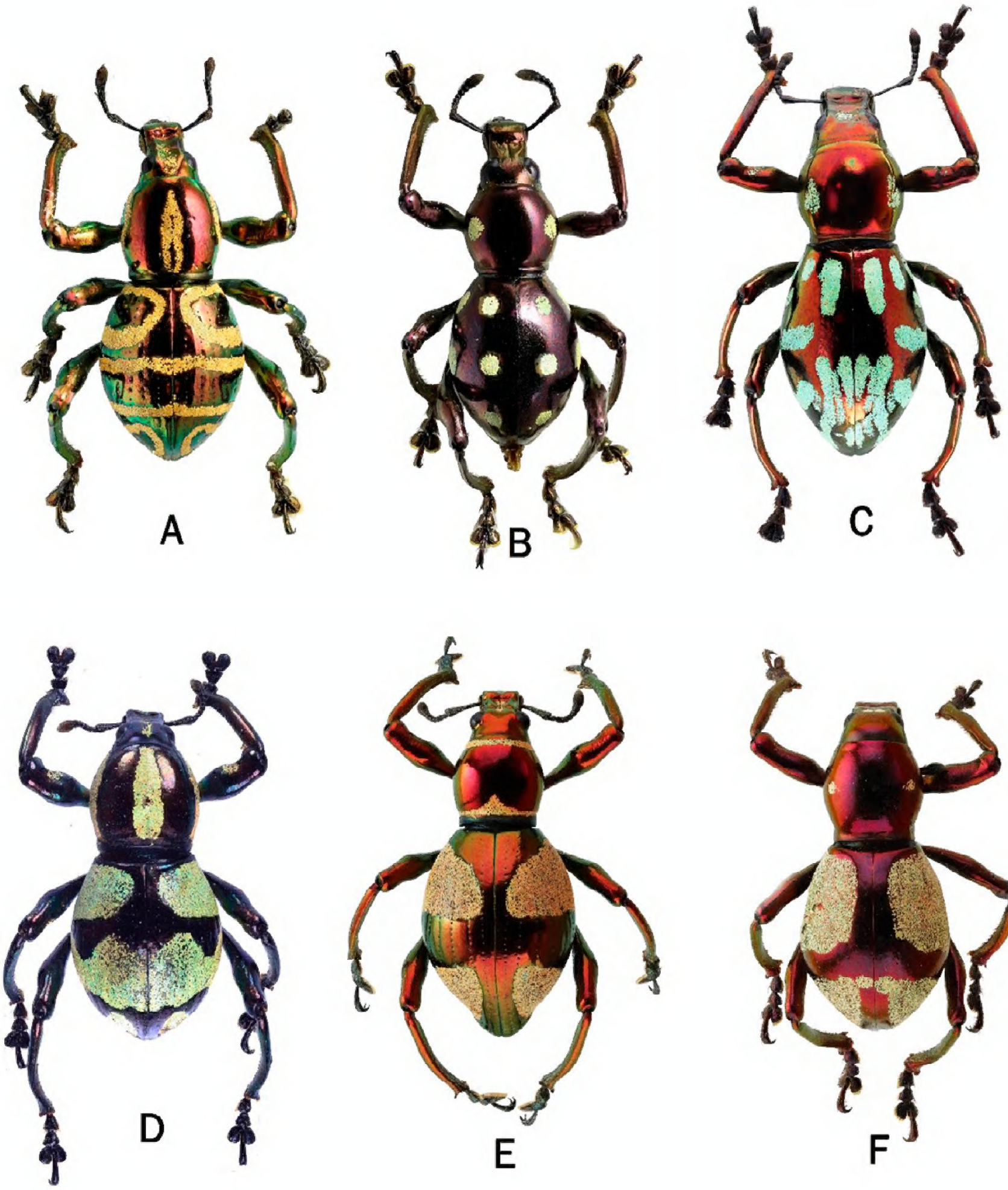

Figure 3. *Pachyrhynchus* spp. in Davao City. **A.** *P. speciosus*. **B.** *P. erichsoni*. **C.** *P. obumanuvu*. **D.** *P. miltoni*. **E.** *P. pseudamabilis*. **F.** *P. apoensis*.

Catigan, Toril, Davao City.

Remarks. This species is very prevalent in the foothills of Catigan Toril, which is the southeastern slope of Mount Apo. It co-exists with *Orthocyrtus* cf. *schoenherri*, which is a new record of mimicry for this species (Yoshitake 2017). *Metapocyrtus* sp. 1 is abundant in the Cogon Grass and shrubs.

Metapocyrtus sp. 2

Materials examined. PHILIPPINES – **Davao City** • Marilog District: Eagle's Ridge (Dologon-Busco-Quezon Road, Datu Salumay); 07.1686°N, 125.1941°E; 532 m a.s.l.; iii.2017; local collector; opportunistic; 1♂, UMCRCM2.

Identification. Integument black. Prothorax subglobular, with narrow, scaly stripes across anterior and posterior margins and a transverse, scaly stripe on median part. Elytra with longitudinal basal and subapical scaly stripes. We were unable to fully identify this species based on the available specimens.

Endemism and distribution. A Mindanao endemic. Marilog District, Davao City.

Genus *Pachyrhynchus* Germar, 1824

The genus *Pachyrhynchus* is represented by over 165 species, of which the majority are endemic to the Philippines, while other species occur in Indonesia, Taiwan, and Japan. The genus is mainly characterized by the lack

of a distinct transverse groove on the head between the forehead and rostrum, the dorsally swollen apical half of the rostrum, simple antennal scrobes, the antennal scape not reaching posterior margin of the eye, and the entire episternal suture (Schultze 1923).

Pachyrhynchus amabilis Schultze, 1922

Materials examined. PHILIPPINES – **Davao City** • Catigan, Toril; 07.0047°N, 125.2407°E; 1000 m a.s.l.; xi.2019; local coll.; opportunistic; 1♂, 1♀, UMCRCP1–4.

Identification. Rostrum and pronotum dark red; body dark coppery brown. Prothorax with narrow stripes along anterior and posterior margins, and with broad latero-ventral patch on each side. Each elytron with two golden-yellow, scaly patches, one basally and another on apical half.

Endemism and distribution. A Mindanao endemic. Lindaban, Bukidnon (Schultze 1922); Davao City*.

Conservation status. Vulnerable (DENR-DAO 2019).

Remarks. This species was collected on the fronds of the Bracken Fern, *Pteridium aquilinum* (L.) Kuhn (Dennstaedtiaceae).

Pachyrhynchus apoensis Yoshitake, 2012

Figure 3F

Materials examined. PHILIPPINES – **Davao City** • Sicao Village, Tamayong, Calinan; 07.0231°N, 125.2021°E; 1600 m a.s.l.; xi.2019; local collector; opportunistic; 3♂, 2♀, UMCRCP5–9.

Identification. Integument glossy red. Pronotum with two small spots on each side of disc. Each elytron with elongate, postmedian spot along suture, a small elongate subapical spot along suture, a large basal patch, and a large apical patch.

Endemism and distribution. A Mindanao endemic. Mount Apo.

Conservation status. Vulnerable (DENR-DAO 2019).

Remarks. The species seems to occurs throughout Mount Apo, such as along Kidapawan trail on the western side, as well in Calinan, and Sicao Village, Davao City, on the eastern side.

Pachyrhynchus davaoensis Schultze, 1934

Materials examined. PHILIPPINES – **Davao City** • Catigan, Toril; 07.0047°N, 125.2407°E; 1000 m a.s.l.; xi.2019; local collector; opportunistic; 1♂, 1♀, UMCRCP32–33.

Identification. Integument red. Pronotum with subcircular, scaly marks on latero-ventral parts and longitudinal stripe at middle. Each elytron with three transverse, narrow, elliptical scaly rings, with the basal and subapical not reaching sutures.

Endemism and distribution. A Mindanao endemic. Bukidnon; Mount Apo (Schultze 1934); Tamayong, Calinan, Davao City.

Conservation status. Vulnerable (DENR-DAO 2019).

Remarks. This species was collected at an elevation of 1000 m a.s.l. at the edge of the forest in Tamayong, Calinan.

Pachyrhynchus erichsoni (Waterhouse, 1842)

Figure 3B

Materials examined. PHILIPPINES – **Davao City** • Sicao Village, Tamayong, Calinan; 07.0231°N, 125.2021°E; 1600 m a.s.l.; xi.2019; local collector; opportunistic; 3♂, 4♀, UMCRCP34–40 • Marilog District: Eagle's Ridge forest (Dologon-Busco-Quezon Road, Datu Salumay); 07.1686°N, 125.1941°E; 532 m a.s.l.; iii.2017; local collector; opportunistic; 2♂, 3♀, UMCRCP41–45 • Catigan, Toril; 07.0047°N, 125.2407°E; 1000 m a.s.l.; 29.iv–1.v.2019; A. Shavrin; 1♂, UMCRCP46.

Identification. Integument coppery brown. Prothorax with two spots on each side of disc and two spots on each lateral margin. Each elytron with eight spots: two on basal parts, two in median portion, three subapical, and one on apical margin.

Endemism and distribution. A Mindanao endemic. Surigao, Dinagat, Leyte (Schultze 1923), Marilog District, Catigan, Toril, and Tamayong, Calinan, Davao City.

Conservation status. Vulnerable (DENR-DAO 2019).

Remarks. This species has a Philippine-wide distribution, although future studies may prove otherwise. Among *Pachyrhynchus* species, this is the most widespread at higher elevations above 1000 m a.s.l. *Pachyrhynchus erichsoni* are usually collected at the edge of forests or within secondary forests. Collected specimens were active during the day and perching on the abaxial fronds of a fern at night. The *P. erichsoni* complex has been documented on the following plants: *Melastoma malabathricum* L. (Melastomastaceae), *Lithocarpus boholensis* (Merr.) Rehder (Fagaceae), *Dendrocnide* sp. (Urticaceae), *Callicarpa* sp. (Lamiaceae), *Philodendron* sp. (Araceae), and *Amaranthus* sp. (Amaranthaceae).

Pachyrhynchus miltoni Cabras & Rukmane, 2016

Figure 3D

Materials examined. PHILIPPINES – **Davao City** • Sicao Village, Tamayong, Calinan; 07.0231°N, 125.2021°E; 1600 m a.s.l.; xi.2019; local collector; opportunistic; 6♂, 5♀, UMCRCP47–57 • Baganihan, Lawi Lawi Adventure Park and Cottages (km 77, Davao-BUDA Highway, Epol); 07.2718°N, 125.1425°E; 1239 m a.s.l.; 28.iii.2018; A. Rukmane; opportunistic; 1♂, UMCRCP58.

Identification. Integument glossy dark red to coppery brown. Prothorax with a longitudinal band on median portion and large scaly patch on sides. Each elytron with three broad transverse bands; median band constricted in middle portion.

Endemism and distribution. A Mindanao endemic. Marilog District, Davao City.

Remarks. This species was found at 1600 m a.s.l. in semi-open forests in Marilog District or in areas adjacent to secondary forests. It was found perching on ferns and shrubs, or a few were collected while copulating on

the stem of Cacao, *Theobroma cacao* L. (Malvaceae). Whether this species is infesting Cacao fruits is yet unknown. *Pachyrhynchus miltoni* has been documented on *Melastoma malabathricum* (Melastomastaceae), *Piper aduncum* L. (Piperaceae), *Lithocarpus boholensis* (Fagaceae), *Theobroma cacao* (Malvaceae), *Atuna racemosa* Raf. (Chrysobalanaceae), and *Helianthus* sp. (Asteraceae).

***Pachyrhynchus pseudamabilis* Yoshitake, 2012**
Figure 3E

Materials examined. PHILIPPINES – **Davao City** • Sicao Village, Tamayong, Calinan; 07.0231°N, 125.2021°E; 1600 m a.s.l.; xi.2019; local collector; opportunistic; 2♂, 1♀, UMCRC59–61 • Marilog District: Eagle's Ridge (Dologon-Busco-Quezon Road, Datu Salumay); 07.1686°N, 125.1941°E; 532 m a.s.l.; iii.2017; local collector; opportunistic; 3♂, 4♀, UMCRCP62–71.

Identification. Integument red. Prothorax with narrow stripes along anterior and posterior margins, and broad lateroventral patch on each side. Each elytron with two large, scaly patches, one basally and another on apical half. Color and elytral marks highly variable.

Endemism and distribution. A Mindanao endemic. Mount Apo (Yoshitake 2012), Marilog District, Davao City.

Conservation status. Vulnerable (DENR-DAO 2019).

Remarks. This species was abundant in the forests of Marilog District and Tamayong, Toril. It was most abundant in *Theobroma cacao* (Malvaceae) but has also been collected from *Croton leiophyllus* Müll.Arg. (Euphorbiaceae), *Piper aduncum* (Piperaceae), and *Lithocarpus boholensis* (Fagaceae).

***Pachyrhynchus speciosus* (Waterhouse, 1841)**
Figure 3A

Materials examined. PHILIPPINES – **Davao City** • Sicao Village, Tamayong, Calinan; 07.0231°N, 125.2021°E; 1600 m a.s.l.; xi.2019; local collector; opportunistic; 5♂, 10♀, UMCRCP72–86 • Marilog District: Eagle's Ridge (Dologon-Busco-Quezon Road, Datu Salumay); 07.1686°N, 125.1941°E; 532 m a.s.l.; iii.2017; local collector; opportunistic; 2♂, 3♀, UMCRCP87–91.

Identification. Integument red. Pronotum with subcircular, scaly rings on latero-ventral parts, and two longitudinal stripes in the middle, narrowly separated but confluent at both ends. Each elytron with three transverse, narrow, elliptical rings, with basal and subapical rings not reaching sutures.

Endemism and distribution. A Mindanao endemic. Surigao Province, Surigao; Siargao; Bucas Grande; Dinagat; Saob, Cotabato Province; Bilar, Bohol (Schultze 1923); Marilog District, Catigan, Toril, Davao City.

Conservation status. Vulnerable (DENR-DAO 2019).

Remarks. *Pachyrhynchus speciosus* was collected within or at the edge of the secondary forests at an elevation of not below 1100 m a.s.l. It was collected on the leaves of *Melastoma malabathricum* (Melastomastaceae), and *Medinilla cumingii* Naudin (Melastomastaceae).

***Pachyrhynchus sulphureomaculatus* (Schultze, 1922)**

Materials examined. PHILIPPINES – Davao City • Marilog District: Eagle's Ridge (Dologon-Busco-Quezon Road, Datu Salumay); 07.1686°N, 125.1941°E; 532 m a.s.l.; iii.2017; local collector; opportunistic; 3♂, 2♀, UMCRCP92–96.

Identification. Integument black. Prothorax with two spots on each side of disc and broad patch on lateroventral parts. Each elytron with two basal spots, two spots in middle, and three subapical spots, one postmedian spot along suture, one basal elliptical patch along lateral margin, one long elliptical patch in middle along side, one long elliptical patch in middle along lateral margin, and one elongated spot at apical margin.

Endemism and distribution. A Mindanao endemic. Cotabato (Schultze 1922); Marilog District, Davao City.

Conservation status. Vulnerable (DENR-DAO 2019).

Remarks. This species was collected in secondary forests of Marilog and was on *Lithocarpus boholensis* (Fagaceae).

***Pachyrhynchus obumanuvu* Cabras, Medina, Donato & Van Dam, 2021**
Figure 3C

Materials examined. PHILIPPINES – **Davao City** • Sicao Village, Tamayong, Calinan; 07.0231°N, 125.2021°E; 1600 m a.s.l.; xi.2019; local collector; opportunistic; 7♂, 5♀, UMCRCPxc1–12.

Identification. Integument dark burnished red, with a weak greenish sheen. Prothorax with narrow band towards side of anterior margin, two elongated spots on both sides of middle of disc, and thick patches in latero-ventral sides. Each elytron with three subbasal patches, one small subcircular patch just below or, at times, in between middle subbasal patch and lateral patch, median transverse band, antemedian stripe on lateral margin, postmedian subsutural stripe, lateral margin stripe, narrow elliptical stripe between subsutural and sutural patches, postmedian elliptical patch along suture, subapical elliptical patch along suture, oblique reniform subapical patch, and a narrow elliptical subapical spot near lateral margin.

Endemism and distribution. A Mindanao endemic. Davao City.

Remarks. This species was collected in mixed secondary forests and found on leaves and stems of *Procris urdanetensis* Elmer (Urticaceae), a Philippine endemic, and *Elatostema* sp. (Urticaceae).

Discussion

Among our sampling sites, Marilog District was found to have the most species-rich and diverse pachyrhynchine

fauna, with 288 specimens collected belonging to 23 species, including six *Pachyrhynchus* species and 17 *Metapocyrtus*. This is followed by Catigan, Toril, with 233 specimens and 17 species (five *Pachyrhynchus* and 12 *Metapocyrtus*). The third richest site was Sicao Village, where 181 specimens were collected belonging to 15 species (five *Pachyrhynchus*, and 10 *Metapocyrtus*). The duration of the sampling, as well as the woodland habitats at Marilog, Catigan and Sicao Village are factors favoring the greater presence of species. Among the areas sampled, UM Matina and Shrine Hills Matina had the fewest species at one each. Since Pachyrhynchini are generally associated with forested habitats, the continuous conversion of forests in Davao City to farmland, resorts, and human habitation is a threat to their populations.

Among the two genera, *Metapocyrtus* species seem to have higher adaptability and can thrive in anthropized areas, while *Pachyrhynchus* are restricted to forested habitats. Among the *Metapocyrtus* species, *M. adspersus*, *M. apoensis*, and *M. bituberosus* can thrive in green pockets in the downtown area of Davao City, such as the University of Mindanao, Matina campus, and in Shrine Hills Matina. Other species that can withstand anthropogenic disturbances are several other *Metapocyrtus* species, such as *M. lineaticollis* and *M. clemensi*. These species were documented in secondary forests of Baguio District, Calinan, and Matina. Except for UM Matina, the areas in Baguio District and Calinan are adjacent to mountainous ecosystems. The rest of the species of the genus *Pachyrhynchus* were documented only in intact and semi-intact secondary forest as well as along forest edges. Despite the conversion of many forest habitats into banana plantations, resorts, and human habitation, the presence of green pockets enabled some species to thrive. This is especially emphasized with the discovery of *M.* (*Orthocyrtus*) *davaoensis*, *M.* (*Metapocyrtus*) *ged*, and *P. obumanuvu* in a unique habitat in Carmen Baguio District, a bottleneck between agricultural land and secondary forests.

Other than anthropization, elevation is an important factor in Pachyrynchini species richness, abundance, and distribution. *Metapocyrtus* species documented in lowlands at approximately 20–100 m a.s.l. include *M. adpersus*, *M. apoensis*, and *M. bituberusos*. All other species were documented at much higher elevations ranging from 450 m a.s.l. in Calinan to 1,330 m a.s.l. in Marilog District. *Metapocyrtus lineaticollis* and *M. clemensi* were recorded at around 500m a.s.l. while *Pachyrhynchus* species were collected above 800 m a.s.l. This is consistent with the findings of Cabras et al. (2017), who noted that the higher-elevation preference of *Pachyrhynchus* species on Mount Apo, S. Cotabato, and Mount Kiamo, Bukidnon. Pachyrhynchini thrive in good forest habitats at higher elevations. In Davao City, we note that species richness and diversity increase with increased elevation; there is a positive linear relationship between elevation and species richness (Figs. 4, 5). However, as we did not sample above 1400 m a.s.l., we cannot extend this trend of species richness and abundance above that elevation.

The species of Pachyrhynchini documented in Davao City were collected from various macrohabitats such as shrubs and tree trunks near the creeks, streams, forest edges, mountain ridge, and along human trails inside closed and semi-open forests. Although several *Pachyrhynchus* species such as *P. speciosus* and *P. pseudamabilis* were documented in areas adjacent to farms and resorts, these areas usually had thick vegetation nearby. Of note, we did not find *Pachyrhynchus* species in areas with high anthropization, which is in contrast to *Metapocyrtus* species. Generally, the collection of Pachyrynchini is better in open areas such as on forest edges and along ridges. Only a few of the *Pachyrhynchus* species were collected in shrubs in the understory of forests. This may be attributed to the preference of pachyrynchines to bask in the sun, which make them difficult to find in the dense forest understory.

Many of the Pachyrhynchini species were collected on leaves, branches, and trunks of the plants from the families Melastomataceae, Asteraceae, Malvaceae, Apocynaceae, Fagaceae, Balsaminaceae, Piperaceae, Rutaceae, and Urticaceae, among others. *Metapocyrtus* are more versatile in their plant associations and seem not to be plant specific. As for *Pachyrhynchus*, a strong association has been observed with plants from the families Fagaceae and Melastomatacea, such as *Medinilla* spp. and *Melastoma* spp. Among the plants with the greatest number of *Pachyrhynchus* associations are *Melastoma malabathricum* (Melastomastaceae), *Medinilla cumingii* (Melastomastaceae), and *Lithocarpus boholensis* (Fagaceae), which all are native to the Philippines, and *Medinilla cumingii* and *Lithocarpus boholensis*, which are endemic to the country. The association of endemic weevils to endemic and native plants was previously noted by Schultze (1923). However, several species of *Pachyrhynchus*, such as *P. miltoni*, *P. speciosus*, and *P. pseudamabilis* were also found on *Theobroma cacao* (Malvaceae) which is a species introduced to the Philippines. Previous observations have also noted the feeding preferences of *Pachyrhynchus* species (Cabras 2021; Cabras et al. 2021c). Cacao has been associated with other Pachyrhynchini, such as *Pachyrhynchus moniliferus* Germar, 1824, whose larvae feed on its fruit (Kayashima 1940), and *Pantorhytes* spp. who bore into Cacao trunks, causing its eventual demise (Gressitt 1966), as well as *Pachyrhynchus reticulatus*, whose specimens were collected on cacao plants (Cabras 2021). Whether *Pachyrhynchus* feed on the plants is still to be determined.

Pachyrhynchus species were often not found feeding in the wild and were only documented copulating, perching, and climbing the branches and trunks of plants. *Metapocyrtus*, on the other hand, were mostly loose and documented on any plant; however, some species such as *M. adspersus*, *M. apoensis*, and *M. bituberosus* were particularly found to be feeding on the flowers of

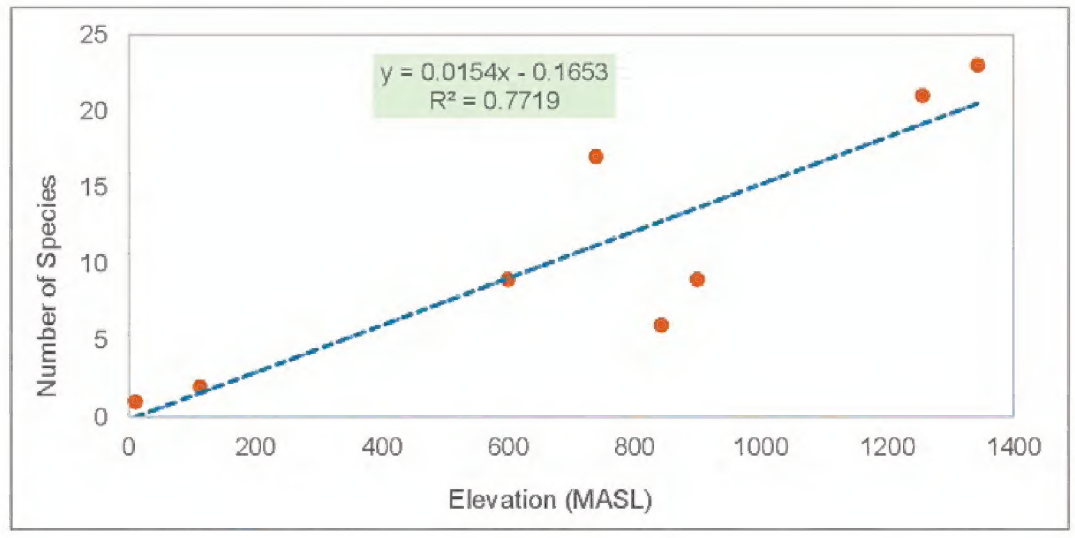

Figure 4. Linear relationship between elevation and number of species.

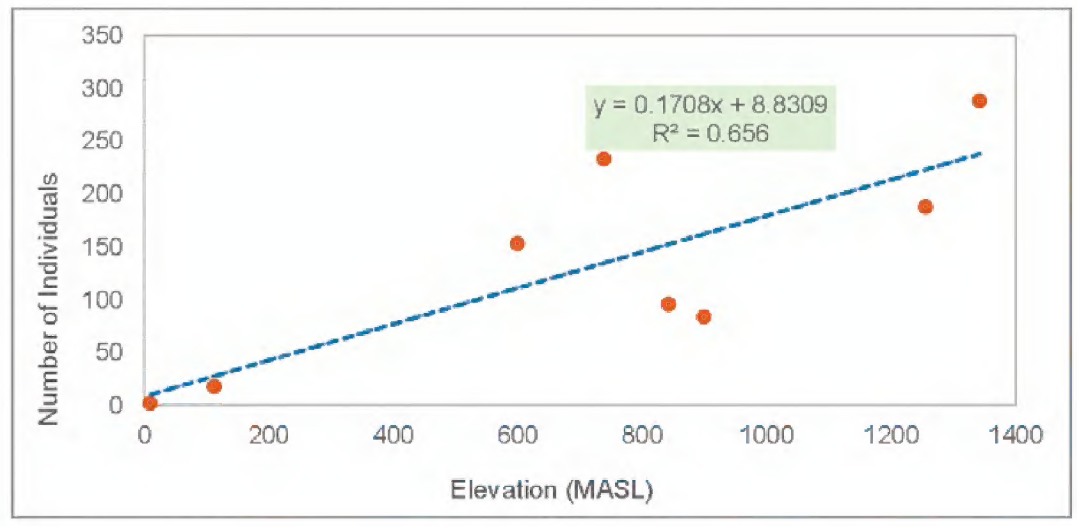

Figure 5. Linear relationship between elevation and number of individuals.

Melastoma malabathricum. It is noteworthy that *Pachyrhynchus* species, especially *P. miltoni* and *P. pseudamabilis*, were documented on the invasive *Piper aduncum* (Piperaceae).

Although several species of Pachyrhynchini are considered pests, little is known on the mode of infestation of these species especially for the island-endemic species in Mindanao. The only records so far of *Pachyrhynchus* infestation are the larvae of *P. moniliferus* which feed on the fruit of *Theobroma cacao* (Kayashima 1940), and larvae of *P. infernalis* Fairmaire, 1879 which feed on the xylem of *Mangifera indica* L. (Anacardiaceae), causing the tree to weaken and even wither (Ôshiro 1991). In Papua New Guinea, *Pantorhytes*, which are also members of the same tribe and native to the Papuan region, are already considered as serious pests to *T. cacao* (Gressitt 1966). However, in the Philippines, there is still scarcity of studies on *Pachyrhychus* and *Metapocyrtus* as serious pests in agriculture.

Most of the land area of Davao City and other cities in the Philippines is still entomologically unexplored. With the discovery of ten new species of Pachyrhynchini in Davao City in the last five years, the opportunity for discovering new species not only in Pachyrhynchini in Davao City is very high. Endemic and rare pachyrhynchine species of thrive in high-elevation areas with good remaining vegetation; thus, the continuous conversion of forests for human habitation and agricultural purposes poses a threat to their continued existence. The high species richness, diversity, and endemism in selected areas in Davao City, particularly in the remaining forest patches, call for immediate conservation measures of these priceless species.

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Authors' Contributions

Conceptualization: AAC, MNDM. Data curation: ELP, MJP, CT. Formal analysis: AAC, MNDM, RC. Methodology: MJP, CT, ELP. Resources: CT, TS. Software: TS, CT, ELP, RC. Supervision: AAC, MNDM, AR. Validation: AR. Writing – original draft: AAC. Writing – review and editing: MNDM.

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